TRANSPORTATION Revolution 5 Mississippi Valley Conference

MoDOT's Success In Reducing Bridge Deck Cracking

Presented By

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PROBLEM : Shrinkage Cracking

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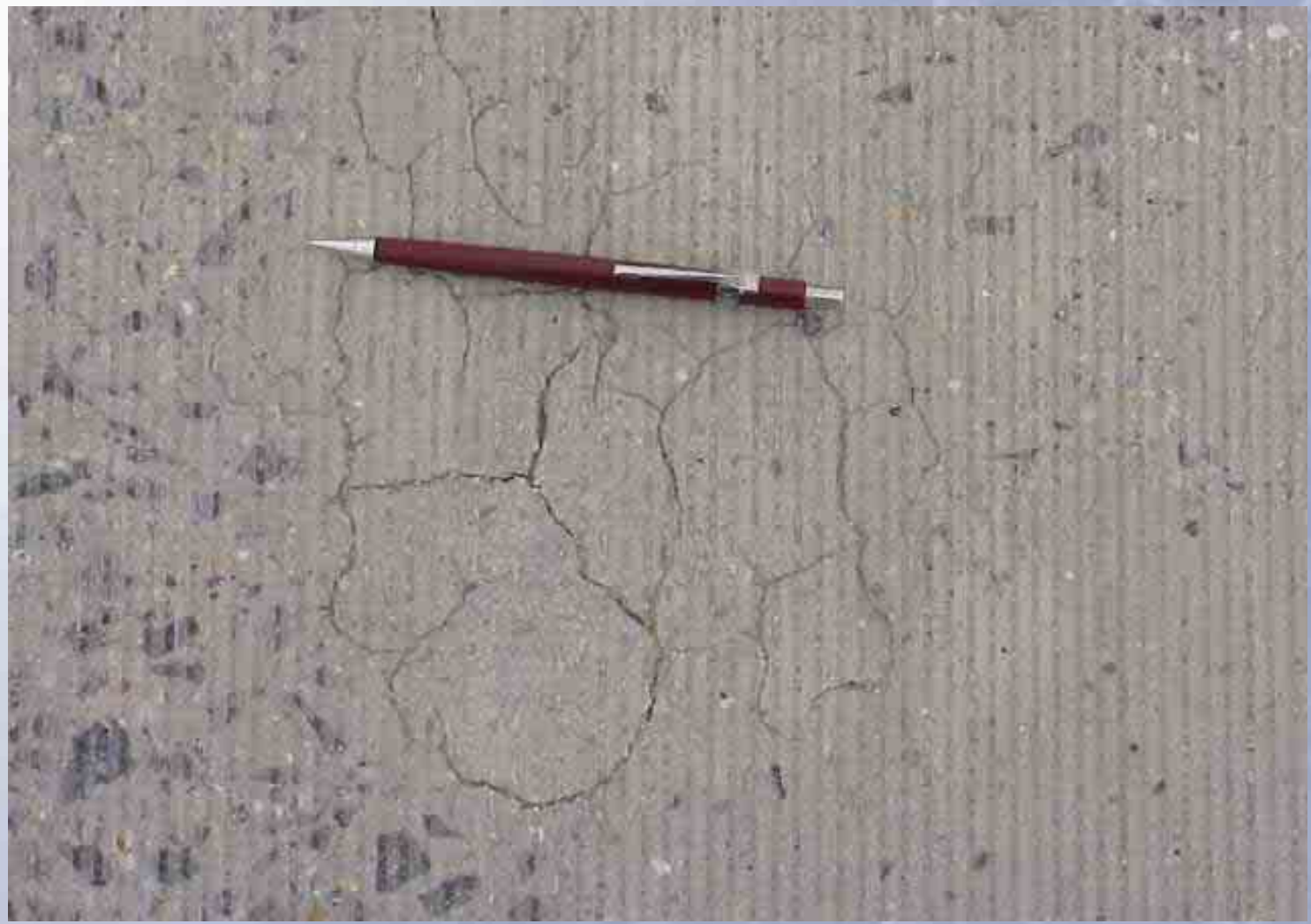
Shrinkage Cracking



Bridge Deck Task Force Recommendations

- Placing and curing changes
- Training for bridge deck placement
- Mix design changes
- Design changes that influence deck cracking

Changes in Placing & Curing Specs.

	Old Spec.	New Spec.
Max. Ambient Temp.	90 F	85 F
Max. Concrete Temp.	90 F	85 F
Curing Compound (Dissipating)	None	Applied Immediately after Tining
Time Limit on Placing Wet Cure	None	Wet Cure within 90 minutes after Tining
Days of Wet Cure	5 Days	7 Days

Temperature Changes

- Max. Ambient Air Temperature Limit = 85 F
  - Reduces the evaporation rate
- Max. Concrete Placement Temperature Limit = 85 F
  - Reduces internal concrete stresses
- Temperature Limits Increase Night Pours
  - Lower air temperatures
  - Lower Solar Radiation
  - Higher Relative Humidity

Interim Curing Compound

- Curing Compound Applied Immediately After Texturing
  - Protects concrete surface from moisture loss at critical time before the wet cure is in place.

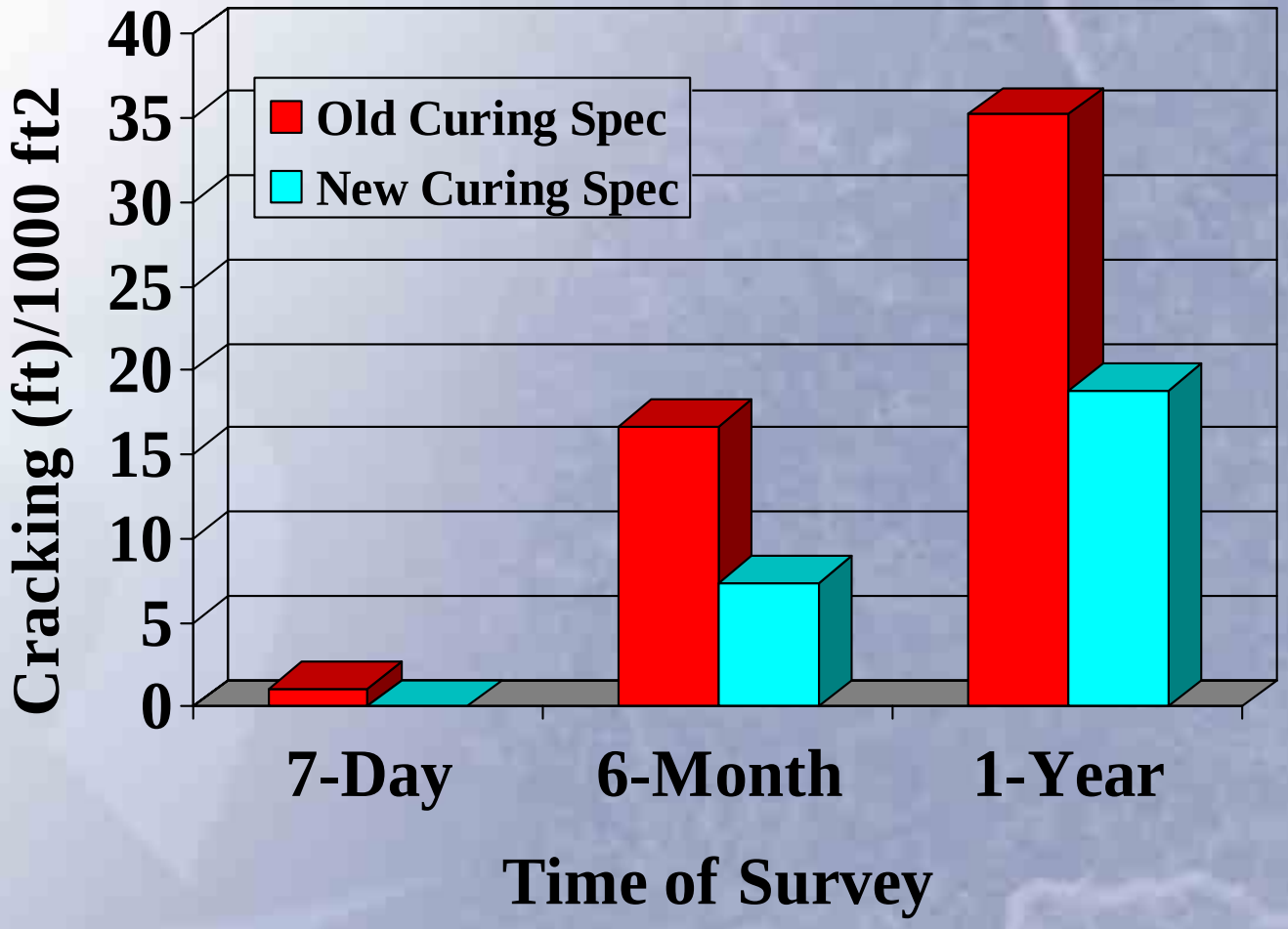
Time Limit on Saturated Curing

- Moist curing mats shall be placed within 90 minutes from when the concrete was textured.
  - Some cases the 90 minutes is not enough time; but provides a very good guideline.
  - Important that the curing is conducted progressively in relation to the deck pour.

7-Day Saturated Curing

- Extended saturated wet cure prevents moisture loss from the concrete so the cement particles can fully hydrate. Improves all concrete characteristics.

Curing & Placing Specifications



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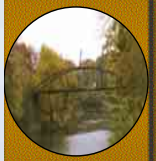
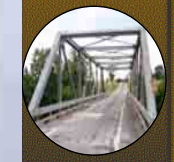
Training







MoDOT

U.S. Department of Transportation
Federal Highway Administration

Bridge Deck Placement

Pre-pour Meeting & Check List

- MoDOT conducts a pre-pour meeting with the contractor.
- The training video is reviewed to illustrate what good practices should be adhered to and their importance in the final product.
- The pre-pour check list is reviewed so all contingencies are prepared for.

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Finishing Characteristics

What is an acceptable finish?

Finishing Issue

Acceptable Finish

Unacceptable Finish

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Examples of Good Practices

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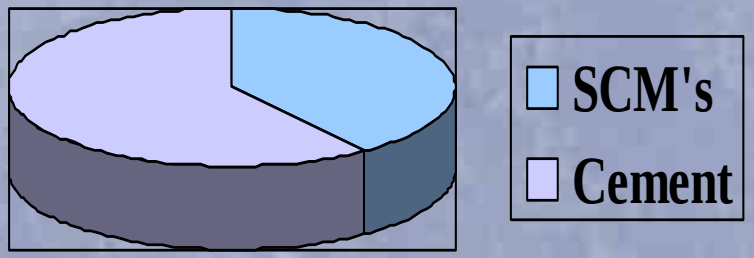
Examples of Bad Practices

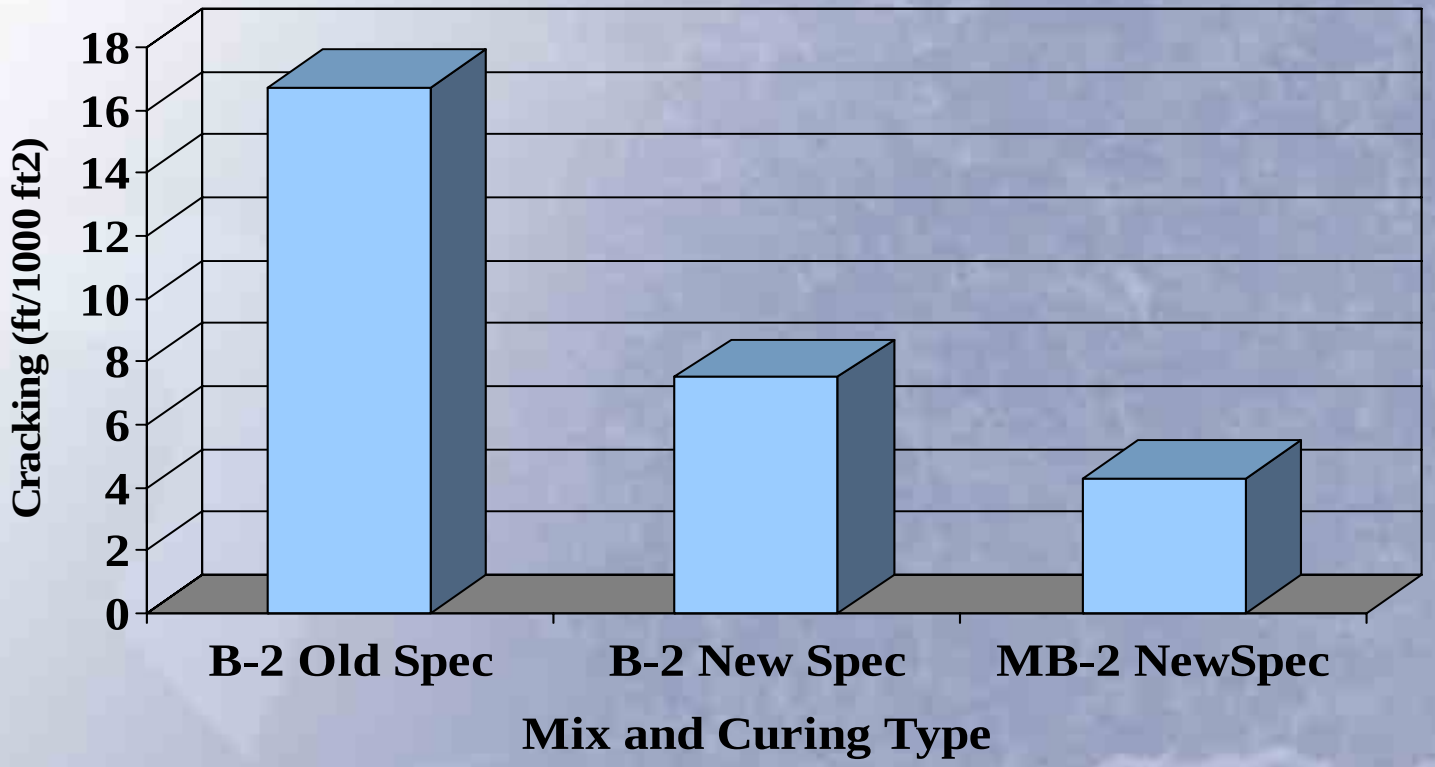
Mix Design Changes

- Lower Total Cementitious Content
  - Min. 7.5 sk./yd^3 to 6.5 sk./yd^3
- Supplementary Cementitious Replacements
  - 25% Class C Flyash
  - 40% GGBFS
  - 6-8 % Silica Fume
  - Ternary Combinations (< 40% Total Replacement)
    - **25% GGBFS/15% Class C Flyash**



- Type A Water Reducer Requirements
- Increased Maximum Slump
  - 3.0 inches to 6.0 inches

MB-2 Mix vs B-2 Mix 6-Month Surveys



MB-2 Placing Characteristics

- Mix is a little “Stickier” to finish.
- Comments that the MB-2 mix is much easier to consolidate and place compared to the B-2 mix.
- Max slump allowed is 6.0” due to the addition of mid range water reducer.

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Thank You !